

SERVICE MANUAL

DIGITAL SYNTHESIZER TUNER

SANSUI TU-D33X TU-D33XL



CAUTION

1. Parts identified by the \triangle symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.



SANSUI ELECTRIC CO., LTD.

•SPECIFICATIONS

TU-D33X

FM Section

Tuning range 88 to 108 MHz
Usable sensitivity
Mono IHF 10.8 dBf (1.9 μ V : T100)
DIN 0.95 μ V

50 dB quieting sensitivity

Mono 16.0 dBf
Stereo 36.0 dBf

Signal to noise ratio at 65 dBf

Mono 78 dB
Stereo 72 dB

Distortion at 65 dBf

Mono less than 0.08% at 1,000 Hz
Stereo less than 0.12% at 1,000 Hz

Alternate channel selectivity (at 400 kHz)

..... 60 dB
..... 1.0 dB

Capture ratio

..... 45 dB

Image response ratio

..... 75 dB

Stereo separation

..... 40 dB at 1,000 Hz

Frequency response

Stereo 30 to 15,000 Hz, +0.3 dB, -0.8 dB

Antenna input impedance

..... 300 ohms balanced
..... 75 ohms unbalanced

AM Section

Tuning range 530 to 1,600 kHz
Usable sensitivity 50 dB/m (316 μ V/m)
Signal to noise ratio 50 dB

Image response ratio

..... 45 dB at 1,000 kHz

Others

Output voltage and impedance

..... 775 mV/2.2 kohms

Power requirements

..... 120/220/240V, 50/60 Hz

For U.S.A. and Canada 120V (60 Hz)

Power consumption

..... 9 watts

Dimensions

..... 430 mm (16-15/16")W

..... 46 mm (1-13/16")H

..... 227 mm (8-15/16")D

Weight

..... 2.3 kg (5.1 lbs) net

..... 2.9 kg (6.4 lbs) packed

TU-D33XL

FM Section

Tuning range 88 to 108 MHz

Usable sensitivity

Mono IHF 10.8 dBf (1.9 μ V : T100)

DIN 0.95 μ V

50 dB quieting sensitivity

Mono 16.0 dBf

Stereo 36.0 dBf

Signal to noise ratio at 65 dBf

Mono 78 dB

Stereo 72 dB

Distortion at 65 dBf

Mono less than 0.08% at 1,000 Hz

Stereo less than 0.12% at 1,000 Hz

Alternate channel selectivity (at 400 kHz)

..... 60 dB

..... 1.0 dB

Capture ratio

..... 45 dB

Image response ratio

..... 75 dB

Stereo separation

..... 40 dB at 1,000 Hz

Frequency response

Stereo 30 to 15,000 Hz, +0.3 dB, -0.8 dB

Antenna input impedance

..... 300 ohms balanced

..... 75 ohms unbalanced

AM (MW, LW) Section

Tuning range MW: 530 to 1,600 kHz

..... LW: 153 to 360 kHz

Usable sensitivity

MW: 50 dB/m (316 μ V/m)

LW: 60 dB/m at 250 kHz

Signal to noise ratio (MW)

..... 50 dB

Image response ratio (MW)

..... 45 dB at 1,000 kHz

Others

Output voltage and impedance

..... 775 mV/2.2 kohms

Power requirements

..... 220/240V, 50/60 Hz

Power consumption

..... 9 watts

Dimensions

..... 430 mm (16-15/16")W

..... 46 mm (1-13/16")H

..... 227 mm (8-15/16")D

Weight

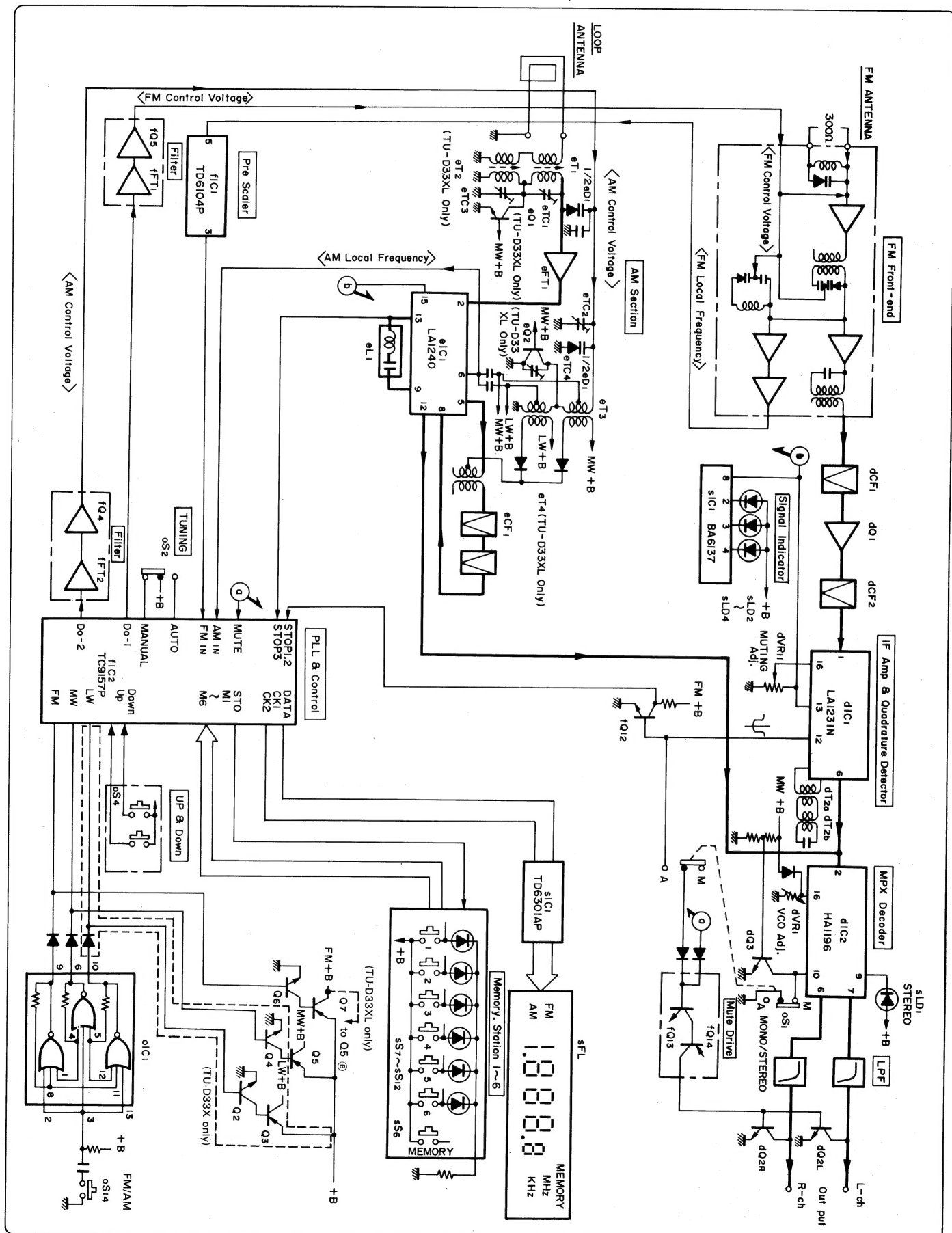
..... 2.3 kg (5.1 lbs) net

..... 2.9 kg (6.4 lbs) packed

* Design and specifications subject to changes without notice for improvements.

* In order to simplify the explanation illustrations may sometimes differ from the originals.

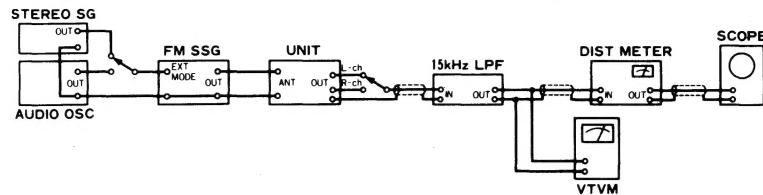
1. BLOCK DIAGRAM



2. ADJUSTMENTS

2-1. FM Adjustment (See Top View on Page 11)

1) FM IF & Reference Frequency Adjustment (See Parts Location on page 6, 7)



Note: 1. SELECTOR..... FM 2. FM MUTING/MODE..... OFF/MONO

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	98MHz ANT Input 20dBf (14.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	Between Point(A) (dVR11, F-4600) & Earth DC Volt Meter	IFT Coil (Front-end)	Max. DC Volt	
2.	Discriminator Coil Adj. In case of using Genescope	1 No Input	—	Between Test Point(B) & Point(C) (F-4600) DC Volt Meter	dT1 (F-4658)	DC 0V ± 30mV	•Repeat procedures as stated in subject 1 & 2.
		2 Output 60dB, Genescope	Point(D) (JW51)	Between Point(E) (JW13 or 2 & Earth)	dT2 (F-4658)	Steep linearity of S curve. Make symmetrical S curve.	
	Discriminator Coil Adj. In case of using Dist meter	1 No Input	—	Between Test Point(B) & Point(C) (F-4600) DC Volt Meter	dT1 (F-4658)	DC 0V ± 30mV	•Repeat procedures as stated in subject 1 & 2.
		2 98MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	•Output Terminal VTVM/SCOPE & Dist Meter	dT2 (F-4658)	Min. THD	

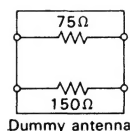
•ADJUSTMENT FOR FM

There are two kind in indication of FM SSG output attenuator

1. Attenuator with marking of 75Ω open open indication type.
2. Attenuator with marking of 75Ω load or close load or close indication type.

FM SG output level in this FM adjustment are described as open indication type.
To feed FM signal, a dummy antenna circuit as Fig. 2-1 must be connected between FM SG output and ANT terminal (300Ω) of the unit.

Fig. 2-1



- The following table shows relations among FM SG attenuator indication (dB), available power ratio (dBf) and antenna terminal voltage (dB/μV) in each indication type.

	FM SG Attenuator Indication	Available Power Ratio	Antenna Terminal Voltage
Open indication type	0 dB 66 dB	-0.8 dBf 65.2 dBf	-6 dB/μV 60 dB/μV
Load or close indication type	0 dB 60 dB	5.2 dBf 65.2 dBf	0 dB/μV 60 dB/μV

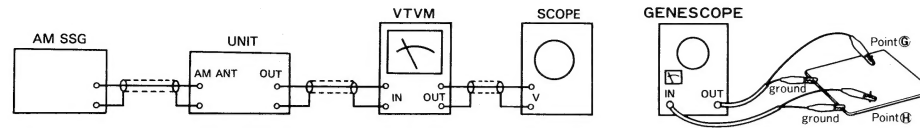
2) FM STEREO Adjustment

1. SELECTOR..... FM 2. FM MUTING/MODE..... AUTO

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	PLL VCO Adj.	98MHz ANT Input 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), R or L MODE 1kHz + Pilot (100% MOD.), STEREO SG	ANT terminal 300Ω	Stereo Indicator	dVR1 (F-4659)	Light indicator	Adjust the dVR1 within center of light level
	PLL VCO Adj. In case of using Freq.	98MHz ANT Input 65dBf (59.8dB), FM SSG, No MOD.	Same as above	Between Point(F) (Pin 9 of dIC2) & Earth Freq. Counter	dVR1 (F-4659)	19kHz ± 50Hz	
2.	Muting level Adj.	98MHz ANT Input 22dBf (16.8dB), FM SSG, Pilot 19kHz (9% MOD.), L or R MODE 1kHz + Pilot (100% MOD.) STEREO SG.	Same as above	Stereo indicator OUTPUT L-CH or R-CH, VTVM & SCOPE	dVR11 (F-4600)	Stereo indicator turns ON or Output Signal comes out	

2-2. AM Adjustment (See Top View on Page 11)

1) AM IF Adjustment & MW (AM) Tuning Adjustment



Note: 1) SELECTOR..... AM (TU-D33X)/MW (TU-D33XL)

2) Connect AM loop antenna to AM antenna terminal.

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	Genescope Output 0dB	PointⒸ (JW4 or 21) (F-4600)	Between PointⒹ (eC26, F-4657) & Earth	eT5, eL1 (F-4657)	Max. Waveform	•Before this adjustment, remove the F-4659 circuit board. Refer to "how to remove it" on page 4.
2.	522kHz (9kHz step) or 520kHz (10kHz step) Tuning Adj.	No Input	—	Between PointⒹ (eR2, F-4600) & Earth DC Volt Meter	eT3 (F-4600)	1V ± 0.1V	•Repeat procedures as stated in subject 2 & 3.
3.	1610kHz (10kHz step) or 1611kHz (9kHz step) Tuning Adj.	No Input	—	Same as above	eTC2 (F-4600)	8V ± 0.1V	
4.	603kHz (9kHz step) or 600kHz (10kHz step) RF Adj.	603kHz (or 600kHz) ANT Input 30dB 400Hz (30% MOD.), AM SSG	ANT terminal	Output Terminal L-CH or R-CH VTVM & SCOPE	eT1 (F-4600)	Max. Output	
5.	1404kHz (9kHz step) or 1400kHz (10kHz step) RF Adj.	1404kHz (or 1400kHz) ANT Input 30dB 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC1 (F-4600)	Max. Output	

2) LW Tuning Adjustment (TU-D33XL only)

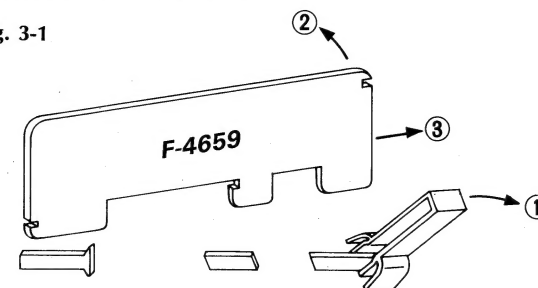
Note: SELECTOR..... LW

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	153kHz Tuning Adj.	No Input	—	Between PointⒹ (eR2, F-4600) & Earth DC Volt Meter	eT4 (F-4600)	1V ± 0.1V	•Repeat procedures as stated in subject 1 & 2.
2.	360kHz Tuning Adj.	No Input	—	Same as above	eTC4 (F-4600)	8V ± 0.1V	
3.	170kHz RF Adj.	170kHz ANT Input 30dB 400Hz (30% MOD.), AM SSG	ANT terminal	Output Terminal L-CH or R-CH VTVM & SCOPE	eT2 (F-4600)	Max. Output	
4.	300kHz RF Adj.	300kHz ANT Input 30dB 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC3 (F-4600)	Max. Output	

3. HOW TO REMOVE F-4659 CIRCUIT BOARD

- 1) Remove bonnet and bottom plate.
- 2) Remove tension wire.
- 3) Unsolder the F-4659 circuit board connection points.
- 4) Pull the F-4659 circuit board holder into the arrow direction①.
- 5) Pull the circuit board into the arrow direction②.
- 6) Pull out the circuit board into the arrow direction③.

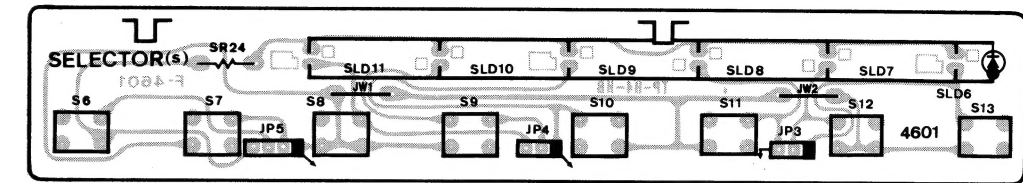
Fig. 3-1



4. PARTS LOCATION & PARTS LIST

4-1. F-4601 Preset Memory Circuit Board

Component Side

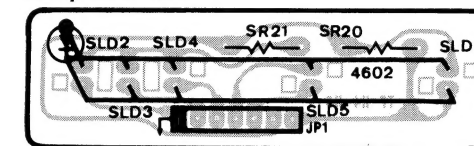


Parts List

Parts No.	Stock No.	Description	Parts No.	Stock No.	Description
oS6	46708100	Push SW., MEMORY	oS10	46708100	Push SW., 4
oS7	46708100	Push SW., 1	oS11	46708100	Push SW., 5
oS8	46708100	Push SW., 2	oS12	46708100	Push SW., 6
oS9	46708100	Push SW., 3	oS13	46708100	Push SW., FM/AM

4-2. F-4602 SIGNAL, LOCKED & STEREO Indicator Board

Component Side

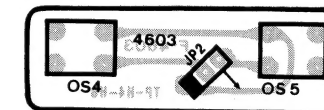


Parts List

Parts No.	Stock No.	Description
•LED		
sLD1	46176900 or 46470200	TLS-123 SEL2210S
sLD2	46470300	SEL2410E
sLD3	46470300	SEL2410E
sLD4	46470300	SEL2410E
sLD5	07251000	TLY-123

4-3. F-4603 UP, DOWN SW. Board

Component Side

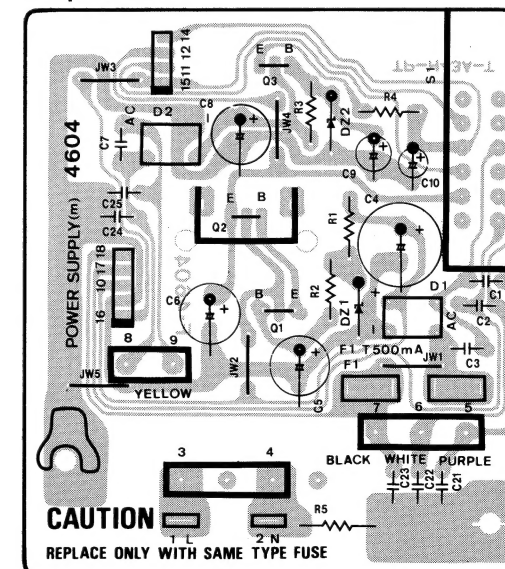


Parts List

Parts No.	Stock No.	Description
oS4	46708100	Push SW., DOWN
oS5	46708100	Push SW., UP

4-4. F-4604 Power Supply Circuit Board

Component Side

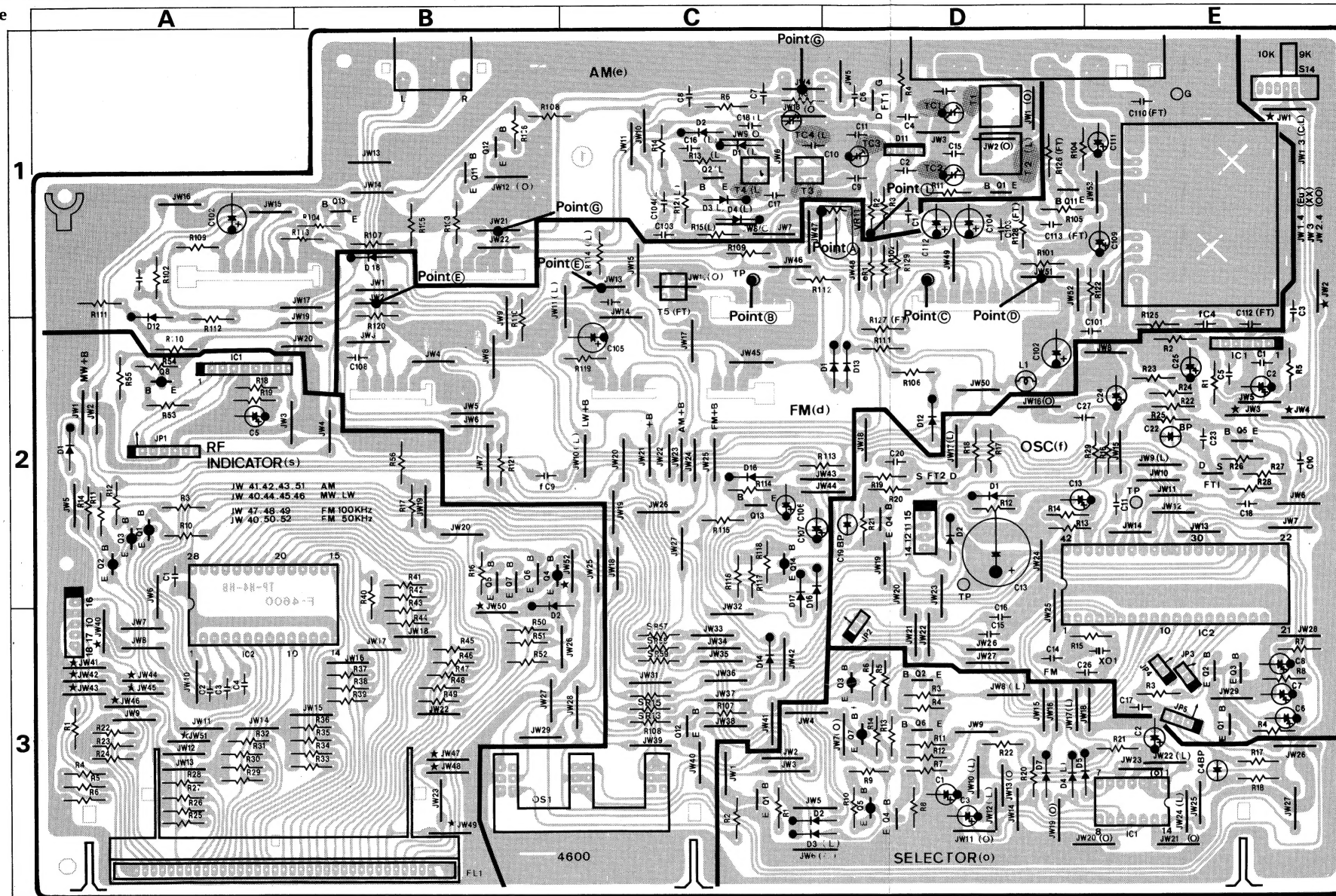


Parts List

Parts No.	Stock No.	Description
•Transistor		
△ mQ1	46367101 or 46367301	2SC2603 2SC2458
△ mQ2	03083901 or 46546701	2SD313AL 2SD880
△ mQ3	03083901 or 46546701	2SD313AL 2SD880
•Diode		
△ mD1	46273600	DBB10-B
△ mD2	46273600	DBB10-B
•Zener Diode		
mDZ1	46114300 or 46114400	05Z13-Z 05Z15-X
mDZ2	46111500 or 46111600	05Z5.6-Y 05Z5.6-Z
△ mC1	08603600	0.022μF 50V C.C.
△ mC3	08603600	0.022μF 50V C.C.
△ mPF1	07184400	Fuse 0.5A 250V (TU-D33XL)
△ mS1	46412500	Push SW., POWER (TU-D33X-XX,UL,CSA)
△	46412400	Push SW., POWER (TU-D33X-SA,EU,AS, TU-D33XL)

4-5. F-4600 Main Circuit Board (Stock No. TU-D33X = 00814701) (Stock No. 00815705 = TU-D33XL)

Component Side



Parts List

Parts No.	Stock No.	Description
dZ1	48120800	FM Frontend Pack
•Transistor		
dQ11	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
dQ12	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
dQ13	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
dQ14	46367001 or 46367201 or 46392001	2SA1115 2SA1048 2SA1175
•Diode		
dD12	03117600 or 46086000	1S2473T77 1S1588TP-3
dD13	03117600 or 46086000	1S2473T77 1S1588TP-3
dD14	03117600 or 46086000	1S2473T77 1S1588TP-3

Parts No.	Stock No.	Description
dD15	03117600 or 46086000	1S2473T77 1S1588TP-3
dD16	03117600 or 46086000	1S2473T77 1S1588TP-3
dD17	03117600 or 46086000	1S2473T77 1S1588TP-3
dD18	03117600 or 46086000	1S2473T77 1S1588TP-3
dC108	46695700	0.016μF 50V F.C.
dL1	46204200	Inductor 3.3μH
dVR11	07241300	10kΩ(B) S.V.R., Muting adj.
•Transistor		
eQ1	46540801	2SC2878 (TU-D33XL)
eQ2	46540801	2SC2878 (TU-D33XL)
eQ11	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
eQ12	46367101 or 46367301 or 46391901	2SC2603 (TU-D33XL) 2SC2458 (TU-D33XL) 2SC2785 (TU-D33XL)

Parts No.	Stock No.	Description
eQ13	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
ΔdR101	08922100	22Ω 1/2W N.I.R.
ΔdR119	00117800	18Ω 1/4W F.R.
ΔdR129	08922100	22Ω 1/2W N.I.R.
•FET		
eFT1	46393000 or 46393001	2SK192A-Y 2SK192A-GR
•Diode		
eD1	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
eD2	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
eD3	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
eD4	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
eD11	46146300	Voltage V.C. Diode KV1236Z2

Parts No.	Stock No.	Description
•Diode		
eD12	03117600 or 46086000	1S2473T77 1S1588TP-3
ΔeR109	08922900	100Ω 1/2W N.I.R.
eTC1	46162800 or 46437400	20pF Trimmer Capacitor 20pF Trimmer Capacitor
eTC2	46162800 or 46437400	20pF Trimmer Capacitor 20pF Trimmer Capacitor
eTC3	46162800 or 46437400	20pF Trimmer Capacitor (TU-D33XL) 20pF Trimmer Capacitor (TU-D33XL)
eTC4	46162800 or 46437400	20pF Trimmer Capacitor (TU-D33XL) 20pF Trimmer Capacitor (TU-D33XL)
eT1	46394600	AM ANT Coil
eT2	46397900	AM RF Coil (TU-D33XL)
eT3	48074300	AM RF Coil
eT4	48074400	LW OSC Coil (TU-D33XL)
•Transistor		
fQ1	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
fQ2	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
fQ3	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
fQ4	46367101 or 46367301 or 46391901	2SC2603 (TU-D33XL) 2SC2458 (TU-D33XL) 2SC2785 (TU-D33XL)
fQ5	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
•FET		
fFT1	46643501 or 46643502 or 46643601 or 46643602	2SK163-K2 2SK163-L1 2SK117-Y 2SK117-GR
fFT2	46643501 or 46643502 or 46643601 or 46643602	2SK163-K2 (TU-D33XL) 2SK163-L1 (TU-D33XL) 2SK117-Y (TU-D33XL) 2SK117-GR (TU-D33XL)
•IC		
fIC1	07225000	TD6104P
fIC2	46397400 or 48127900 or 48128000	TC9157P TC9147BP TC9157AP (TU-D33X-EU, TU-D33XL)
fxO1	07237700	Quartz Element NC-18C
•Diode		
fD1	03117600 or 46086000	1S2473T77 1S1588TP-3
fD2	03117600 or 46086000	1S2473T77 1S1588TP-3
fC12	46579700	4700μF 6.3V E.L.
fC19	08451900	3.3μF 50V E.B. (TU-D33XL)
fC22	08451700	1μF 50V E.B.
•Transistor		
oQ1	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
oQ2	46367101 or 46367301 or 46391901	2SC2603 (TU-D33XL) 2SC2458 (TU-D33XL) 2SC2785 (TU-D33XL)
oQ3	46367001 or 46367201 or 46392001	2SA1115 (TU-D33XL) 2SA1048 (TU-D33XL) 2SA1175 (TU-D33XL)

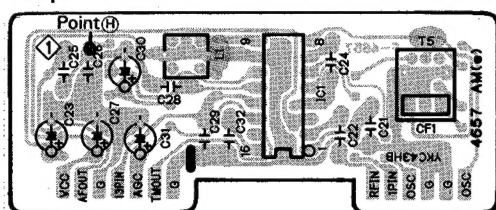
Parts List <F-4600>

Parts No.	Stock No.	Description
oQ4	46367101 or 46367301 or 46391901	2SC2603 (TU-D33XL) 2SC2458 (TU-D33XL) 2SC2785 (TU-D33XL)
oQ5	46367001 or 46367201 or 46392001	2SA1115 2SA1048 2SA1175
oQ6	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
oQ7	46367001 or 46367201 or 46392001	2SA1115 2SA1048 2SA1175
•IC		
oIC1	46426900 or 48055000 or 48122900 or 48123000	μPD4025BC MSM4025BRS HD14025BP TC4025BP
•Diode		
oD2	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
oD3	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
oD4	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
oD5	03117600 or 46086000	1S2473T77 1S1588TP-3
oD7	03117600 or 46086000	1S2473T77 1S1588TP-3
oC4	08450800	3.3μF 16V E.B.
oS1	48069500	Push SW., FM MODE, TUNING, FM NOISE CANCELLER
oS14	46177200	Slide SW., AM STEP (TU-D33X-XX)
oZ1	46547300	4P Terminal Board, Antenna
oZ2	48148500	2P Terminal Board, OUTPUT
•Transistor		
sQ1	46367001 or 46367201 or 46392001	2SA1115 2SA1048 2SA1175
sQ2	46367001 or 46367201 or 46392001	2SA1115 (TU-D33XL) 2SA1048 (TU-D33XL) 2SA1175 (TU-D33XL)
sQ3	46367001 or 46367201 or 46392001	2SA1115 (TU-D33XL) 2SA1048 (TU-D33XL) 2SA1175 (TU-D33XL)

Parts No.	Stock No.	Description
sQ4	46367001 or 46367201 or 46392001	2SA1115 2SA1048 2SA1175
sQ5	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
sQ6	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
sQ7	46367101 or 46367301 or 46391901	2SC2603 2SC2458 2SC2785
sQ8	46367001 or 46367201 or 46392001	2SA1115 2SA1048 2SA1175
•IC		
sIC1	46197200	BA6137
sIC2	46410100	TD6301AP
•Diode		
sD1	03117600 or 46086000	1S2473T77 (TU-D33XL) 1S1588TP-3 (TU-D33XL)
sD2	03117600 or 46086000	1S2473T77 1S1588TP-3
sFL1	48056000	FL. Display Tube FG78L8GR
•LED		
sLD6	46176900 or 46470200	TLS-123 SEL2210S
sLD7	46176900 or 46470200	TLS-123 SEL2210S
sLD8	46176900 or 46470200	TLS-123 SEL2210S
sLD9	46176900 or 46470200	TLS-123 SEL2210S
sLD10	46176900 or 46470200	TLS-123 SEL2210S
sLD11	46176900 or 46470200	TLS-123 SEL2210S

4-6. F-4657 AM IF Circuit Board (Stock No. TU-D33X = 00814201) (Stock No. 00815205 = TU-D33XL)

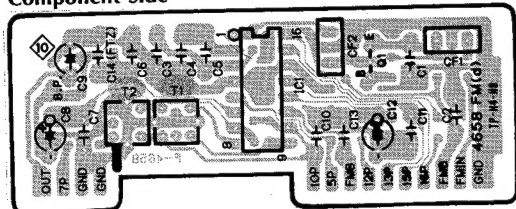
Component Side



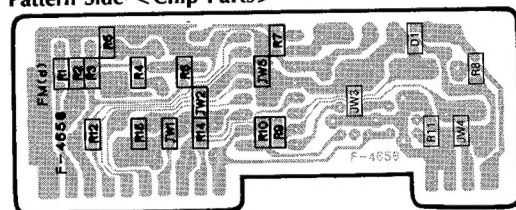
4-7. F-4658 FM IF Amp. Circuit Board

(Stock No. 00814301)

Component Side



Pattern Side <Chip Parts>



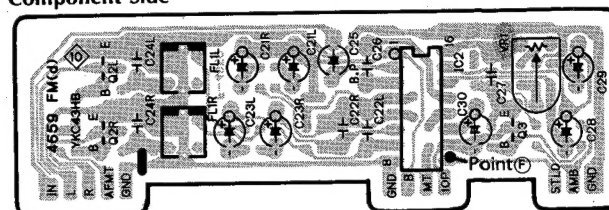
Parts List

Parts No.	Stock No.	Description
•Transistor dQ1	46393201	2SC2786
•IC dIC1	07191200	LA1231N
•Diode dD1	46852000	RLS-73
dJW1	46741100	Cross Conductor (Chip)
dR1	46745800	180Ω 1/8W Chip R.
dR2	46747000	560Ω 1/8W Chip R.
dR3	46747600	1kΩ 1/8W Chip R.
dR4	46745200	100Ω 1/8W Chip R.
dR5	46747400	820Ω 1/8W Chip R.
dR6	46746600	390Ω 1/8W Chip R.
dR7	46746400	330Ω 1/8W Chip R.
dR8	46752400	100kΩ 1/8W Chip R.
dR9	46750800	22kΩ 1/8W Chip R.
dR10	46750400	15kΩ 1/8W Chip R.
dR11	46748800	3.3kΩ 1/8W Chip R.
dR12	46750000	10kΩ 1/8W Chip R.
dR14	46750000	10kΩ 1/8W Chip R.
dR15	46749600	6.8kΩ 1/8W Chip R.
dc9	08450900	4.7μF 16V E.B.
dcF1	46202500	Ceramic Filter SFE10.7MS2 (RED)
dcF2	46202500	Ceramic Filter SFE10.7MS2 (RED)
dT1	48072100	FM IF Coil
dT2	48072200	FM IF Coil

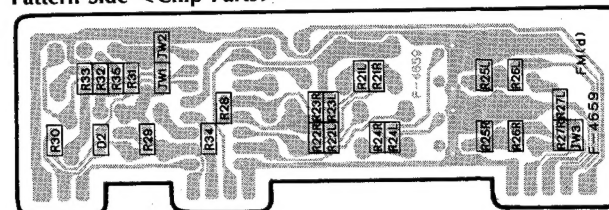
4-8. F-4659 FM MPX Circuit Board

(Stock No. 00814401)

Component Side



Pattern Side <Chip Parts>

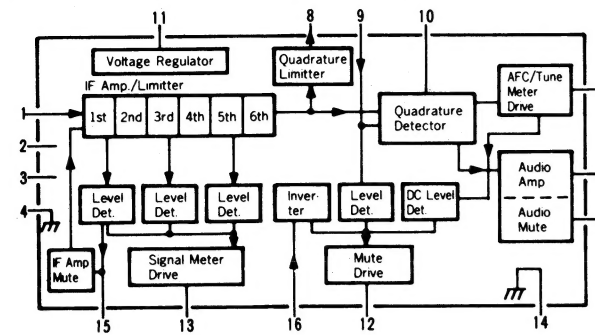


Parts List

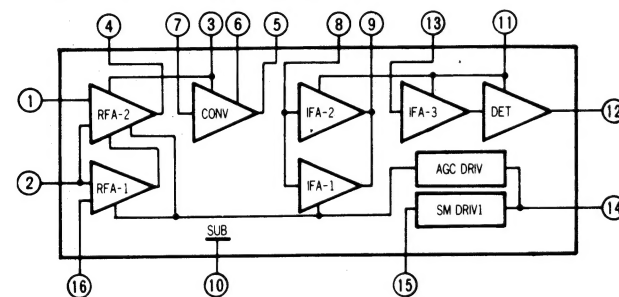
Parts No.	Stock No.	Description
•Transistor dQ2 dQ3	46391901 46391901	2SC2785 2SC2785
•IC dIC2	03603200	HA1196
•Diode dD2	46852000	RLS-73
dJW1	46741100	Cross Conductor (Chip)
dR21	46750200	12kΩ 1/8W Chip R.
dR22	46751600	47kΩ 1/8W Chip R.
dR23	46751000	27kΩ 1/8W Chip R.
dR24	46748400	2.2kΩ 1/8W Chip R.
dR25	46749400	5.6kΩ 1/8W Chip R.
dR26	46747600	1kΩ 1/8W Chip R.
dR27	46748800	3.3kΩ 1/8W Chip R.
dR28	46753000	180kΩ 1/8W Chip R.
dR29	46749200	4.7kΩ 1/8W Chip R.
dR30	46750800	22kΩ 1/8W Chip R.
dR31	46750800	22kΩ 1/8W Chip R.
dR32	46750800	22kΩ 1/8W Chip R.
dR33	46747600	1kΩ 1/8W Chip R.
dR34	46750800	22kΩ 1/8W Chip R.
dR35	46753200	220kΩ 1/8W Chip R.
dc22	46282000	1500pF 50V F.C.
dc24	46531300	5600pF 50V F.C.
dc25	08451200	2.2μF 25V E.B.
dFL1	48072300	Low Pass Filter
dVR1	07241300	10kΩ(B) S.V.R., VCO adj.

5. INTERIOR BLOCK DIAGRAM OF IC & TERMINAL FUNCTION OF TC9157P

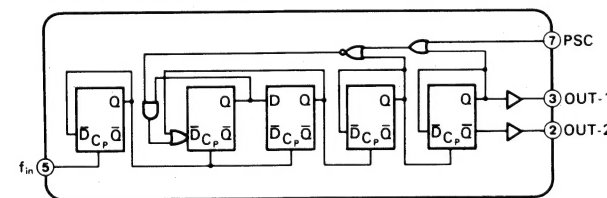
•LA1231N (FM IF AMP & Quadrature Detector IC)



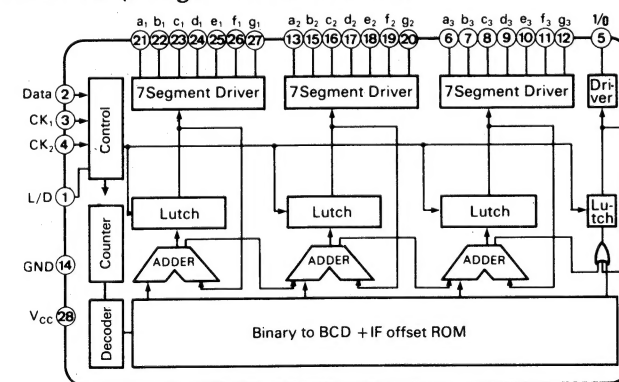
•LA1240/HA1197 (AM Tuner IC)



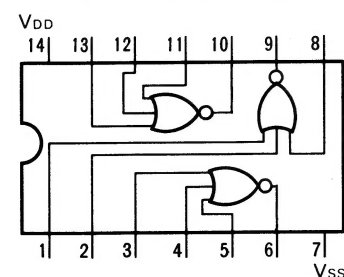
•TD6104P (Prescaler IC)



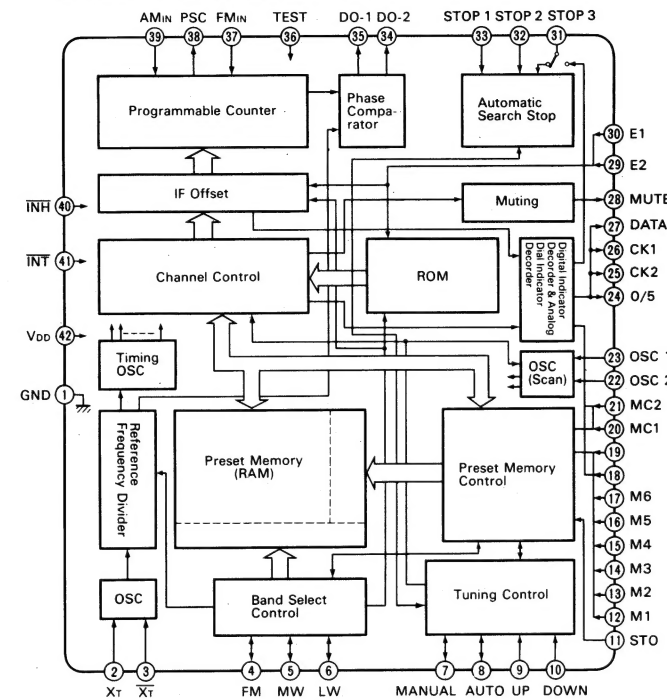
•TD6301P (7 Segment Decoder IC)



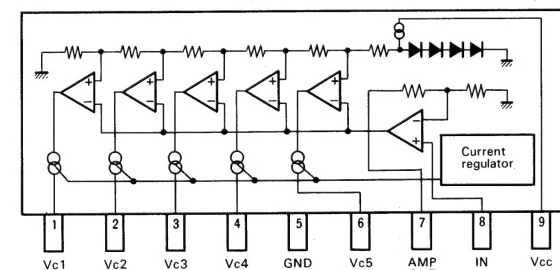
•TC4025BP/μPD4025BP/MSM4025BRS/HD14025BP (Triple NOR IC)



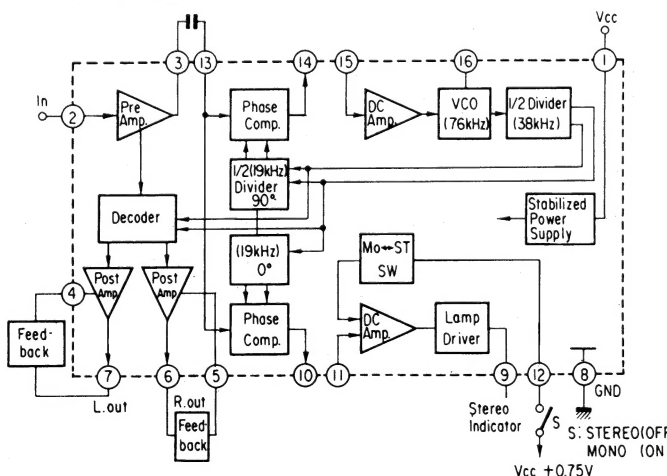
•TC9157P (PLL & Control IC)



•BA6137 (L.E.D. Drive IC)



•HA1196 (MPX IC)



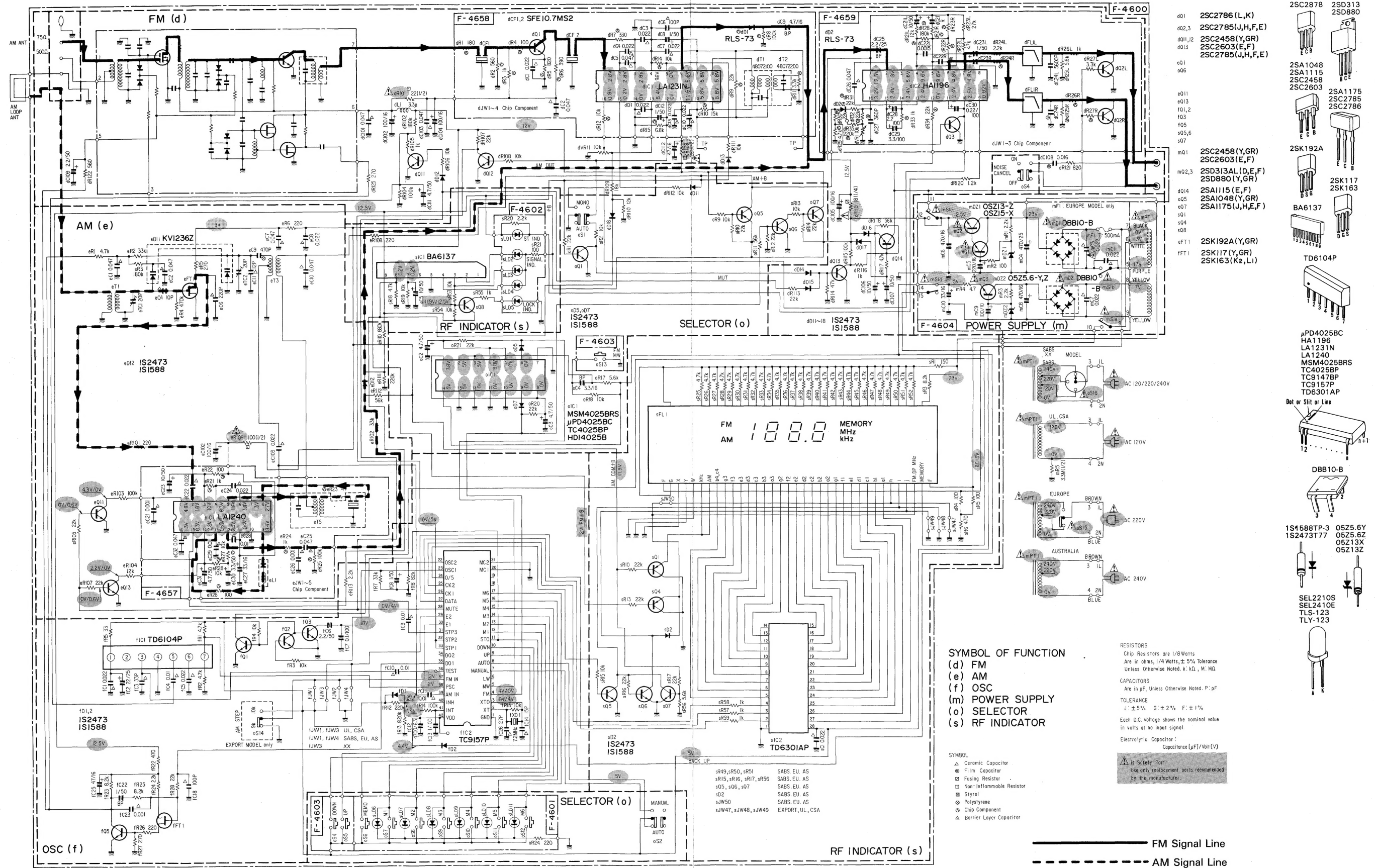
•Terminal Function of LSI-TC9157P

Pin No.	Pin Name	Functions
2,3	X _T X _T	Terminals to connect a quartz oscillator for generating a reference frequency.
4, 5, 6	FM MW LW	Terminals to input a signal for switching FM/MW/LW band.
7, 8	MANUAL AUTO	Terminal to input a signal for switching the manual operation to automatic search operation or vice versa in the UP/DOWN tuning mode. "H": Automatic, "L": Manual
9, 10	UP DOWN	Terminals to input a signal from the tuning key. * In manual operation: When the key is kept depressed for 0.3 sec or more in one-step/one-push step feeding, the operation changes to fast forwarding; when the key is released, the operation stops at the next stop. In this case, even if there is a station on the way, the station is neglected. * In automatic search operation: When the key is depressed once, the automatic search operation starts and stops automatically after having selected the desired station.
11	STO	Terminal to input a signal for storing data in the preset memory unit. Input/output terminal in which a LED driver is provided. * When depressing the STO key, the STO lamp comes on. Next, when any desired memory No. key is depressed, the data on receiving frequency is written into the memory unit and the STO lamp goes off. * When the STO key is depressed and the memory No. key is not depressed, the frequency data is released automatically.
12, 17	M1 M6	Terminals to input a signal for designating memory address. Input/output terminals in which a LED driver is provided. * Terminals M ₁ to M ₆ designate the addresses of FM memory unit in FM receiving and the addresses of AM memory unit in AM receiving. * When depressing the STO key and any desired station key of M ₁ to M ₆ , the data is written into the memory unit. * When depressing any desired station key of M ₁ to M ₆ , the data is read out.
22	OSC 2	Terminal to connect a condenser and resistor for the oscillator for determining the speed of AM automatic search operation.
23	OSC 1	Terminal to connect a condenser and resistor for the oscillator for determining the speed of FM automatic search operation.
24, 25, 26, 27	O/5 CK2 CK1 DATA	Terminals to output the data for displaying the received frequency digitally and a timing signal. The data fed to the driver TD6301P for displaying a static frequency and the timing signal are outputted once only when the frequency is updated in such case as when the power supply is tuned on, the UP/DOWN key is depressed, the automatic scanning operation is made, the data are read out of the memory unit, or FM/AM is switched. In the ordinary receiving state, this terminal is fixed to a "L" level. * O/5: For displaying 50 kHz during FM receiving in Europe. * Data: Binary coded frequency data and receiving band. * CK-1, CK-2: Initialize and transfer clock signals.

Pin No.	Pin Name	Functions
28	MUTE	Terminal to output the muting signal. The terminal is kept in "L" level in ordinary state, and in "H" level in muting.
29, 30	E2 E1	Terminals to input a signal for selecting destinations of Japan, USA, and Europe. * Inputs of terminals E ₁ and E ₂ are read and latched in INH=L state and in FM/AM switching.
31	STOP 3	When a IF450 kHz signal is applied to this terminal during automatic search operation, the scanning operation stops.
32	STOP 2	Terminal to input a signal for performing the automatic search stop. When a "H" level signal is applied to STOP 1 and this terminal during automatic search operation, the scanning operation stops.
33	STOP 1	Terminal to input a signal for slowing the speed of scanning operation. When a "H" level signal is applied to this terminal during automatic search operation, the speed of scanning operation halves.
34, 35	D ₀₋₂ D ₀₋₁	Terminals to output a signal from a phase comparator. These terminals can be used for FM and AM, separately, since the same signal is outputted from the terminals D ₀₋₁ and D ₀₋₂ at the same time.
36	TEST	Terminal to input a signal of test mode. Test mode in "H" level.
37	FM _{IN}	Terminal to input a signal from the FM programmable counter. An amplifier is provided in the input.
38	PSC	Terminal to output a signal for controlling the Prescaler IC of TD6104P.
39	AM _{IN}	Terminal to input a signal from the AM programmable counter. An amplifier is provided in the input.
40	INH	Terminal to input a signal of inhibit. Ordinary operation in "H" level; inhibit operation in "L" level.
41	INT	Terminal to input an initialize signal. This terminal changes to H level in the ordinary operation and to L level in the initialize operation.
42, 1	VDD GND	Power supply terminals. 5V±0.5V.

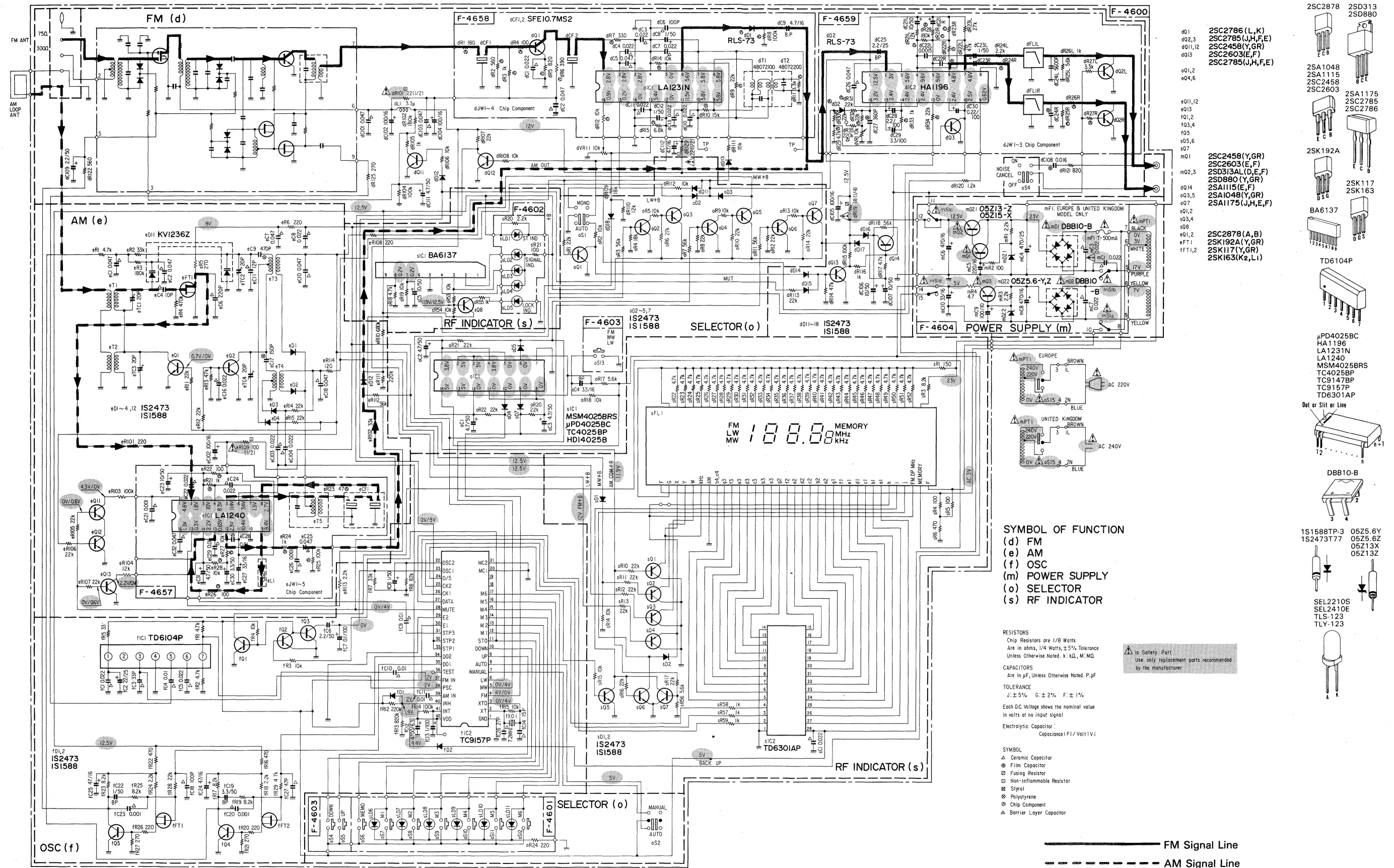
6. SCHEMATIC DIAGRAM 6-1. TU-D33X

* Design and specifications subject to change without notice for improvement.
 * La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
 * Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.



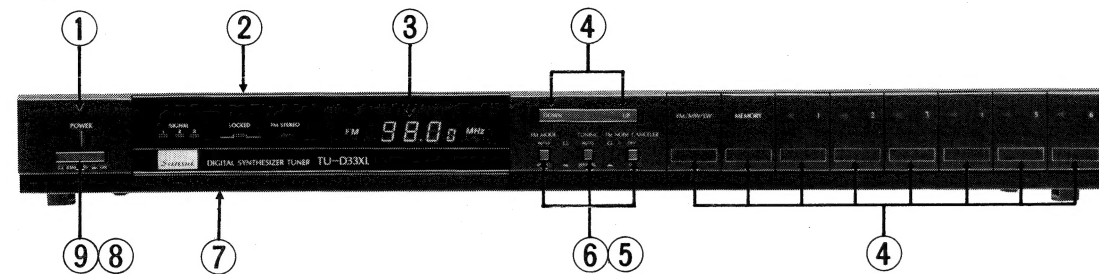
6-2. TU-D33XL

- * Design and specifications subject to change without notice for improvement.
- * La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
- * Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

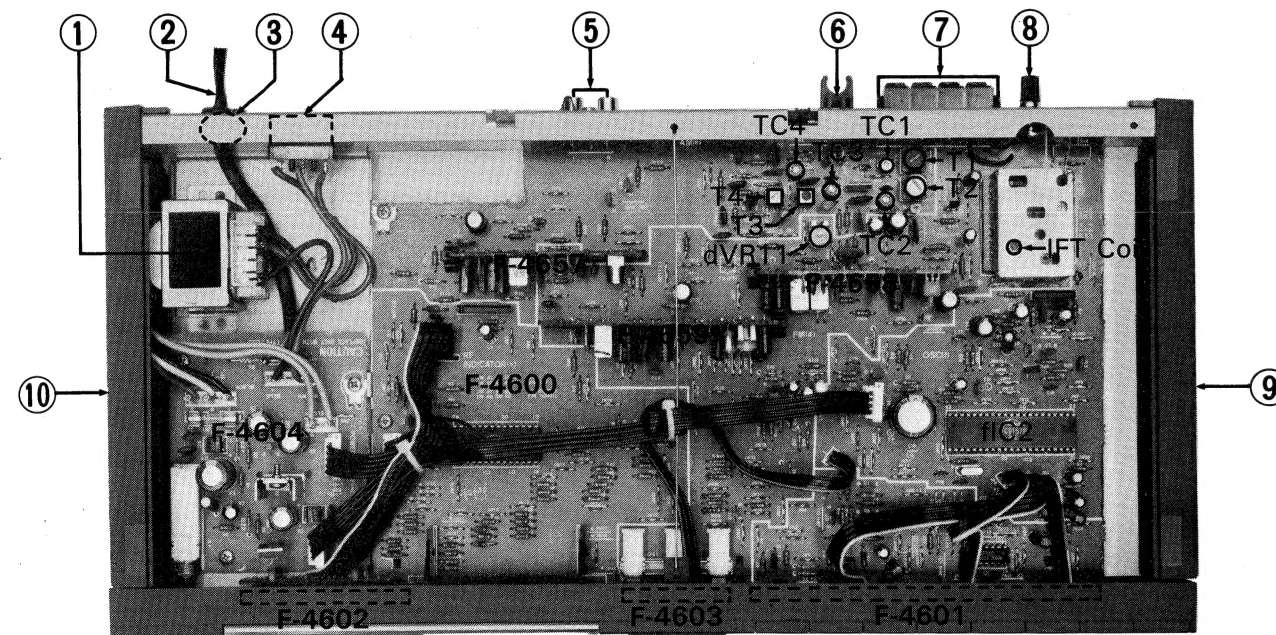


7. OTHER PARTS

7-1. Front View



7-2. Top View



Parts List <Front View>

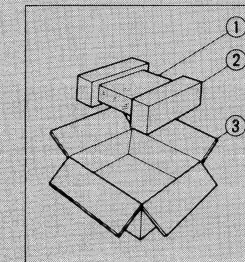
Parts No.	Stock No.	Description
1	47606100	Front Panel Ass'y (TU-D33X)
	47606300	Front Panel Ass'y (TU-D33XL)
2	47602100	Bonnet
3	48056000	FL. Display Tube, FG78L8GR
4	46708100	Push SW., UP, DOWN, FM/AM, MEMORY, 1, 2, 3, 4, 5, 6,
5	07917300	Knob, FM MODE, TUNING, FM NOISE CANCELLER
6	48069500	Push SW., FM MODE, TUNING, FM NOISE CANCELLER
△ 7	48069600	Voltage Selector (TU-D33X-XX,SA)
8	47601400	Knob, POWER
△ 9	46412500	Push SW., POWER (TU-D33X-XX,UL,CSA)
△	46412400	Push SW., POWER (TU-D33X-SA,EU,AS, TU-D33XL)

Parts List <Top View>

Parts No.	Stock No.	Description
△ 1	15017801	Power Transformer (TU-D33X-XX,SA)
△	15017802	Power Transformer (TU-D33X-UL,CSA)
△	15017805	Power Transformer (TU-D33X-EU,AS, TU-D33XL)
△ 2	38004700	Power Supply Cord (TU-D33X-XX,UL,CSA,SA)
△	38004500	Power Supply Cord (TU-D33X-EU, TU-D33XL-EU)
△	38004300	Power Supply Cord (TU-D33XL-BE)
△	07204200	Power Supply Cord (TU-D33X-AS)
3	39106000	Strain Relief (TU-D33X-XX,UL,CSA,SA)
	39104900	Strain Relief (TU-D33X-EU,AS, TU-D33XL)
△ 4	07204700	Slide SW., voltage selector (TU-D33X-EU,AS, TU-D33XL)
5	48148500	2P-Terminal, OUTPUT
6	07193200	Antenna Holder
7	46547300	Antenna Terminal
8	22301510	GND Terminal
9	47538000	Side Panel (Right)
10	47537900	Side Panel (Left)

8. PACKING LIST

Parts No.	Stock No.	Description
1	07599500	Vinyl Cover
2	47178200	Styrofoam Packing
3	47601000	Carton Case (TU-D33X)
	47601800	Carton Case (TU-D33XL)



9. ACCESSORY LIST

Stock No.	Description
38103200	Pin Plug Cord
46051700	FM Antenna
48069700	AM Loop Antenna
46958100	Operating Instruction (TU-D33X)
46958200	Operating Instruction (TU-D33XL)

10. NOTES

When the user moves to different channel step area on FM or AM, the following arrangements must be performed.

Sets Applicable to		Channel Step Frequency		fIC1 Input Port Level		Cross Conductor (F-4600)				9k/10k Switch oS14
		AM	FM	E ₁	E ₂	jw1	jw3	jw4	jw2	
I	South Africa	9 kHz	50 kHz	L	L	—	—	○	○	None
	Europe	9 kHz	50 kHz	H	L	○	—	○	—	None
	America	9 kHz	100 kHz	L	H	—	○	—	○	None
	America	10 kHz	100 kHz	H	H	○	○	—	—	None
II	Sets which 9k/10k Switch is installed	9 kHz	100 kHz	L	H	—	○	—	—	9 kHz
		10 kHz	100 kHz	H	H					10 kHz

•Note: 1) L=Low Level, H=High Level, ○=Connect, —=Remove
 2) oS14=AM 9k/10k Switch on F-4600
 3) Remove the 9k/10 kHz switch only when a user operates the set (II) in 50 kHz channel step (I)

Sansui

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